



## Warning: Soil losing its micronutrients

Farmers Now Face A Test As Plant Malnutrition Due To Lack Of Nutrients In Soil Threaten Production & Business Sustainability

Shenoy Karun & Sudha Nambudiri | TNN

**Kochi:** When you see a necrotic cocunut or relatively smaller black pepper trees, you can infer that this could have been caused by micronutrient deficiency in the soil. Elements like copper, manganese, zinc, iron, boron, molybdenum and sulphur that are essential for plant growth but required in relatively low quantities are called micronutrients. For farmers, malnutrition in plants due to deficiency of these elements, is a concern as it drags down productivity and profits.

The first signs of this problem became visible in Idukki recently when Rajakumari pepper, the finest grade of black pepper, fell victim to this deficiency, bringing down the quantity of 'garbled, extra-bold' berries that could be yielded from a 10kg of dried pepper corns to 2kg. The usual output was 40kg. And this problem is not restricted to pepper alone, almost all agri products in Kerala are affected.

"The right combination of micronutrients is essential to ensure a healthy plant as each plant might be sensitive to a particular micronutrient deficiency; say cocunut to boron or paddy to zinc. If unchecked, this deficiency could affect the overall productivity at farms," said additional director department of soil survey and soil conservation Anitha Kumari M.

Now, help is at hand in the form of soil health card (SHC) - promoted by department of agriculture & cooperation. The central scheme looks at various aspects of the soil and helps farmer manage its health.

During the first cycle of the project, 2.58 crore samples were collected from different areas of the country. During the second cycle another 1.14 crore samples were collected.

As part of this work (during 2010-14) national bureau of soil survey (NBSS) extensively surveyed Kerala and gained insights into soil quality. It found areas deficient in macronutrients and micronutrients.

For example, the deficiency of macronutrient calcium was pronounced in Onattukara sands and Wayanad plateau, while its deficiency was negligible in Kumily and Marayur hills,

Attapadi central and eastern Palakkad. On the other hand, extensive deficiency of micronutrient sulphur was recorded for Onattukara sands, Kumily hills and Wayanad plateau.

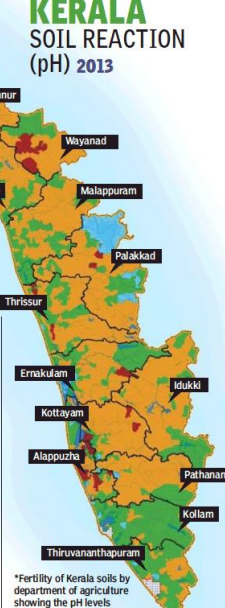
The project, which analyzed 2 lakh soil samples for macro, secondary and micronutrients, later prepared a nutrient management plan (NMP). However, principal investigator of the project K M Nair said that deeper issues were causing this deficiency.

He said the indiscriminate use of NPK fertilizers led to the low yield of black pepper in high ranges. "To counter acidity in soil, farmers in Malabar have traditionally used lime. During Green Revolution in 70s, scientists ignored it. Uncontrolled use of NPK fertilizers resulted in soil acidity," said Nair, a principal scientist with NBSS during the project.

"Acidity in the subsoil inhibits the penetration of roots of black pepper, banana or cardamom plants) from soil to subsoil. So, the plant will be unable to absorb nutrients from subsoil. It will be unable to absorb water from subsoil during summer, when the soil is dry," Nair said. To bring down this acidity, he suggested the use of gypsum with agricultural lime.

Indian Institute of Spices Research (ISIR), Kozhikode, has developed micronutrients customized for black pepper, ginger and turmeric. "These are foliar sprays which have immediate effect on plants. Farmers who used the sprays said that flowering became uniform the very next year," said P Rajeev, principal scientist, ISIR.

Meanwhile, the state agri department is getting soil sampled in each panchayat to address the deficiencies and imbalances of nitrogen, phosphorus and potassium. Officials said that Kudumbashree workers are being trained to take samples. It will take at least three years for recharging the soils.



\*Fertility of Kerala soils by department of agriculture showing the pH levels



### What are micronutrient?

Elements like copper, manganese, zinc, iron, boron, molybdenum and sulphur that are essential for the growth of the plant, but needed in low quantities are called micronutrients

### Present scenario

National bureau of soil survey extensively surveyed Kerala and gained insights into soil quality. It found areas deficient in macronutrients and micronutrients

The project, which analyzed 2 lakh soil samples for macro, secondary and micronutrients, later prepared a nutrient management plan

### SOIL ACIDITY

Extremely acid (pH < 4.5)  
 Strongly acid (pH 4.5-5.5)  
 Moderately acid (pH 5.5-6.5)  
 Neutral & alkaline (pH > 6.5)  
 Urban area

### STATUS OF KERALA\*

Dist	Zinc	Iron	Copper	Manganese	Boron	Sulphur
Alappuzha	10	4	5	38	58	58
Idukki	4	2	0	1	67	45
Kannur	14	8	2	10	62	49
Kasaragod	30	16	15	21	65	47
Kollam	4	1	1	4	32	28
Kottayam	8	4	2	6	33	31
Kozhikode	10	2	4	6	67	61
Malappuram	11	1	3	5	71	61
Palakkad	3	0	0	0	64	50
Pathanamthitta	9	6	29	10	55	78
Trm	8	2	5	7	49	38
Thrissur	9	2	1	1	56	58
Wayanad	8	1	1	3	61	46

(\*Soil deficiency in terms of nutrients. Level of concentration of micronutrients is in ppm. Source: Soil health card project, Government of India)

Right combination of micronutrients is essential to ensure a healthy plant as each plant might be sensitive to a particular micronutrient deficiency; say cocunut to boron or paddy to zinc. If unchecked, this deficiency could affect the overall productivity

- Anitha Kumari M, ADDL DIRECTOR, DEPARTMENT OF SOIL SURVEY & SOIL CONSERVATION  
 G I S Laboratory, NBSS & LUP, Bengaluru 2013

### Climate change another factor

Sudha Nambudiri @timesgroup.com

**Kochi:** Variations in temperature, maximum and minimum rainfall and relative humidity are impacting different plantation crops, especially cardamom. These variations have led to changes in soil temperatures with the destruction of tree cover. Studies conducted by scientists of Indian Cardamom Research Institute (ICRI) showed that temperature variations were evident across states and that the mean air temperature increased significantly over the past 30 years.

The rainfall during monsoon (June-September) showed a downward trend. Relative humidity showed increasing and decreasing trends, respectively at small cardamom and tea growing tracts. "The warming trend, coupled with frequent wet and dry spells during summer, had a favourable effect on insect pests and disease-causing organisms. So, pesticide consumption went up both during excess rainfall and drought years. The incidence of many minor pests, insects and disease pathogens has increased in the recent years along with warming," said director of ICRI in Idukki A K Vijayan.

These detrimental environmental impacts on large cardamom agriculture can be minimized only if micronutrient issue is redressed and by adopting organic cultivation.

## RAJAKUMARI PEPPER LOSES ITS PREMIUM

Shenoy Karun & Sudha Nambudiri | TNN

**Kochi:** Rajakumari pepper, the high-quality black pepper from Rajakumari and surrounding highrange villages, is losing its premium price in the market, said exporters. Due to its relatively high density, size and quality, this variety of pepper had been commanding a premium of Rs 25-30/kg as it had been demanded by snacks and seasonings manufacturers.

"Usually, Rajakumari pepper is in great demand among buyers, but this year it has fallen drastically with almost no takers for it," said Jojan Malayil, CEO of Batha Enterprises, a

leading exporter of spices. Compared to pepper from other regions, Rajakumari pepper has a higher density of 610-620g/litre in comparison with the produce from Adimali or Kumily that have a density of 560-570g/litre. Also, this variety is bigger in size (described as 'extra-bold' in trader parlance) with dried, wrinkled berries having a minimum size of 4.25mm and above.

"Though density remains the same, the percentage of bolder berries has reduced drastically over the past three to four years," Malayil said, adding that deterioration in soil quality and changes in weather pattern were the reasons for this decline.

Siby Kollarekcal, a pepper merchant of Rajakumari, said that he was confronting the issue of low demand for his stock this year. "Usually, intermediaries who collect the product from us and sell it in Kochi could dispose the product in a day. However, now they say that it takes up to one week to find buyers," he said.

"Earlier, you were able to get 35-40 kg of extra-bold berries during the grading of 100kg of ungraded pepper. This has come down to 25kg now," said Joy Othikal, a wholesale dealer who supplies to trading firms in Kochi, the terminal market for black pepper in India. Othikal observed that the density of berries declined

as there was a rain shortfall. "Three years ago, the average density was 650g/litre, which declined to 560-570g/litre last year due to drought. With timely rain during the current crop year, it has grown to 600-610g/litre," he said.

Principal scientist at Indian Institute of Spices Research in Kozhikode P Rajeev said that there were solutions. "We can restore the quality of soil by amelioration process. The deficiency of micronutrients could be cleared by foliar spraying of micronutrients. Another reason for deterioration in quality of pepper is soil acidity which was caused by erratic rainfall. This can be rectified by irrigation," he said.